Getting the Most Out of Your New HDTV

Straight out of the box, today's high-performance HDTVs look impressively bright and crisp compared to conventional TVs. But there's more to making your new HDTV look its best than just taking it out of the box and hooking it up the quickest way you can.

By optimizing the picture controls and video connections on your TV, you can improve image quality dramatically. A few minutes of experimenting will let you make the most of high-quality video sources, and make viewing lower-quality signals more enjoyable. Plus, lowering settings like brightness and contrast can reduce the amount of energy your TV uses — and reduce your electricity bill. Check out our article on TV power consumption at **crutchfield.com/TVpower** for more info.

In this guide, we'll help you:

- get **high-def programming** that really shows off your HDTV
- make **the right connection** between your components and your TV
- adjust your TV's **picture controls** for the best looking picture
- change the **aspect ratio** to suite what you're watching and your personal preference

What you'll see when you start watching your new HDTV

High-definition TVs can do things conventional TVs could never dream of. We've found that new HDTV owners are usually blown away by their TV's high-resolution capabilities.

However, even the finest HDTV can't magically repair a mediocre video signal. Some folks have been disappointed to find that their favorite regular TV shows don't look much, if any, better. That's the fault of the signal, not the TV. Those shows are being broadcast at the same quality they were before, and the picture you see is only as good as the signal your local station, cable company, or satellite company is sending you.

Keep in mind that just because programming is "digital" or being broadcast on an "HD" channel doesn't mean it will always look like a pristine HD demo. For example, if ESPN HD is broadcasting a game that wasn't originally shot in HD, it won't look as sharp and detailed as it would if it had been shot with the latest high-def cameras. Similarly, if you're watching a sitcom on digital cable, you won't get a crystal-clear picture if your cable company, or the local broadcaster supplying your cable company with the signal, has chosen not to pass along the high-def signal.

Most HDTVs include some form of digital noise reduction that can make poor-quality signals more watchable. In particular, this type of video processing can make the compression artifacts that plague digital cable and satellite signals a bit less distracting. You can also try exploring your TV's picture presets and picture-setting menu to increase the sharpness, or optimize other settings based on the signal your source is sending. Get more tips on how to improve non-HD sources on your HDTV at **crutchfield.com/SDandHDTV**

Fortunately, many low-quality TV signals are gradually being replaced by higher-quality ones. There's more and more high-def programming available from over-the-air broadcast, cable, and satellite providers. Plus, over-the-air analog signals are being replaced with digital signals, thanks to a recent government mandate requiring all full-power TV stations stop broadcasting analog signals and switch to 100% digital broadcasting by February 17, 2009. Most of these digital signals will still only be standard definition, but they can provide a crisper, clearer picture than analog signals. For more information, check out our article on the digital TV transition at **crutchfield.com/DTVtransition**

Receiving HDTV programming

There are three ways to get HDTV signals in your home: over-the-air, cable, and satellite broadcasts. Below, we've described these three options. Use the checklists to the right to make sure you have everything you need. You can also watch our video on what you need for HDTV at **crutchfield.com/gettingHD** to get a quick, friendly overview of the options listed below.

Getting over-the-air HDTV

Over 99% of Americans have access to free local digital broadcasts. However, most digital stations don't offer high-def programming 100% of the time; in general, many stations carry standard-def shows in the daytime, and broadcast in high-definition during prime time.

To receive the growing number of over-the-air HD broadcasts available, you'll need an HD-compatible TV with a stand-alone HD (ATSC) tuner or an HDTV with a built-in HD tuner, and an antenna. Depending on your home's proximity to your local stations and your area's geography, you may need anything from simple "rabbit ears" to a large roof- or attic-mounted antenna. One way to make sure you get the right antenna for your location is to ask your neighbors — if any of them are pulling in local HD broadcasts, they'll be able to make some good recommendations.

A checklist of what you'll need:
- ☑ HD-compatible TV
- ☑ HDTV (ATSC) tuner (separate or built-in)
- ☑ indoor or outdoor UHF/VHF antenna
- ☑ local HDTV broadcasts (they're free)

Keep in mind that your antenna will need to be oriented properly relative to your local stations' transmitters to get the best reception. AntennaWeb's antenna mapping website will tell you where your local stations are in relation to you, and what type of outdoor antenna is recommended for your location (www.antennaweb.org). You can also check out our article on choosing and installing an antenna for HDTV at **crutchfield.com/HDTVantennas** for more information.

Getting HDTV from cable

Your cable service needs to be "digital" in order to get HDTV, but (here's the tricky part) having digital cable doesn't necessarily mean you're getting HDTV. Unless it's specifically advertised as being HDTV, typical digital cable service simply offers a mix of analog channels (usually the lower-numbered ones) and digital channels. The digital channels generally look a little cleaner than the analog ones, but are nowhere near as clear and detailed as true HDTV.

A checklist of what you'll need:
- ☑ HD-compatible TV
- ☑ HD-compatible cable box (or CableCARD)
- ☑ HD programming (subscription required)

To get HD cable, you can use either an HD-compatible TV or a TV with a built-in HD tuner. You'll need to subscribe to your cable provider's HD package (if available), and use their HD-capable set top box. (If your TV is CableCARD compatible, you can use a CableCARD instead.) Normally, HD cable programming packages include some, but not necessarily all, of your local broadcast channels. The availability and selection of HDTV channels can vary widely depending on your location, even within the same cable company. Contact your local cable provider for up-to-date information on their HDTV service, and check out our article on understanding cable TV for more in-depth information at **crutchfield.com/digitalcableTV**

Getting HDTV from satellite

Satellite TV provides nationwide access to dozens of high-quality HDTV channels, as well as access to a variety of music channels from XM and Sirius Satellite radio. If you live in a rural area beyond the reach of broadcast and cable TV signals, satellite reception may be your only option for viewing HD programming.

A checklist of what you'll need:
- ☑ HD-compatible TV
- ☑ HD-compatible satellite receiver
- ☑ HD-compatible satellite dish
- ☑ HD programming (subscription required)

DIRECTV® and DISH™ Network offer an ever-increasing number of HD channels. In order to view these channels, you'll need an HD programming subscription, as well as an HD-compatible satellite dish and an HD receiver. If you want over-the-air broadcasts too, you may be in luck — in addition to pulling in standard and high-def satellite broadcasts, many satellite HD receivers can also receive analog and digital over-the-air broadcasts thanks to the Satellite Home Viewer Improvement Act of 1999. (Previously, many satellite TV viewers could only receive their local channels via antenna or cable.) Currently, Dish Network offers local channels in over 175 cities, and DIRECTV offers them to over 90% of U.S. households. You can find more information in our article on understanding satellite TV at **crutchfield.com/satelliteTV**

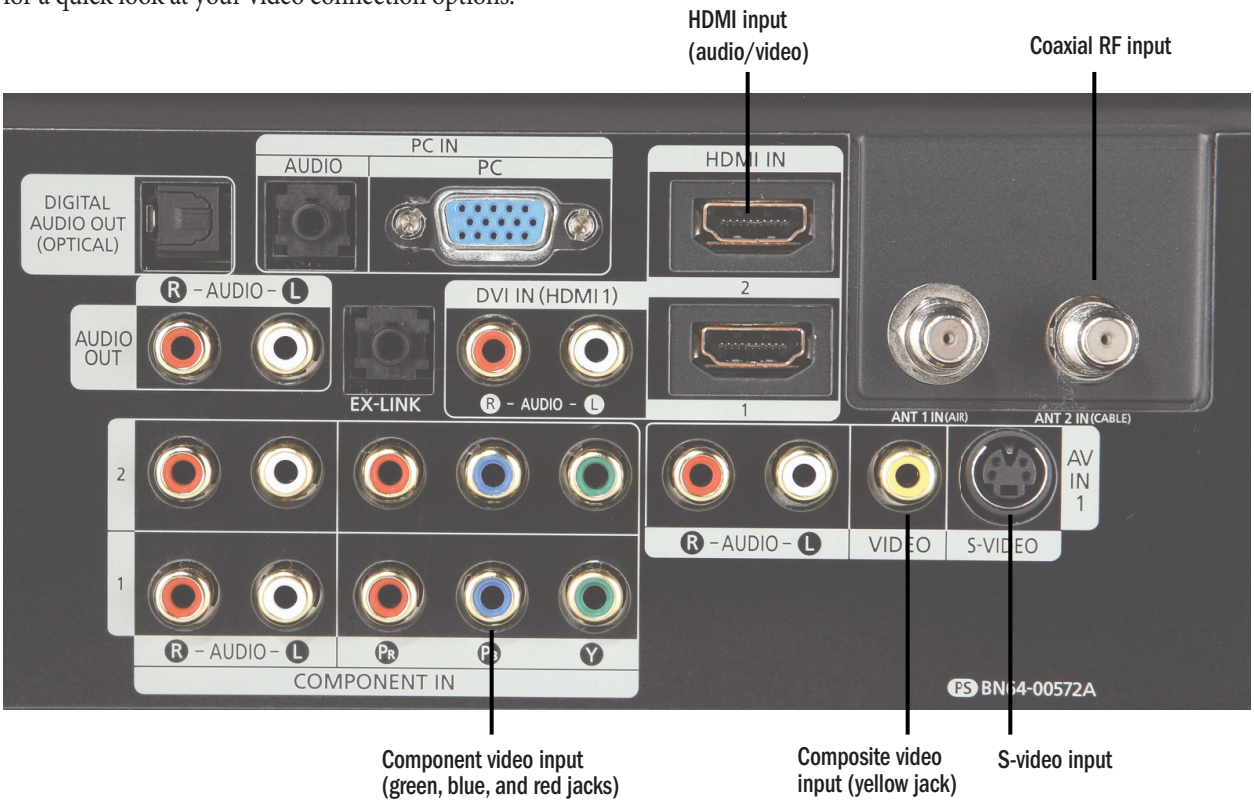
Blu-ray and other high-def sources

High-definition picture quality quickly grows addictive, and many HDTV owners want access to even more HD content than they can get from the sources discussed above. Blu-ray players can deliver an excellent high-def picture — with resolutions up to 1080p — that'll really show off your HDTV. You can also enjoy high-def gaming from the Xbox 360™ and PS3. And of course, the PS3 can also double as a Blu-ray player, giving you the best of both worlds. Find out about what features you should look for in a Blu-ray player using our helpful video at **crutchfield.com/blurayvideo**

Keep in mind that you're not limited to one source if you want to enjoy high-def signals. In fact, most HDTV owners tend to combine sources to get the most options, like combining a Blu-ray Player and HD cable box to get high-def movies and cable, or a small indoor or outdoor antenna and an HD-compatible satellite dish for high-def local and international channels. It all depends on what options appeal to you the most, and on what you're willing to spend. And remember that HDTV is still relatively young. As the demand for HD sources continues to grow, the number of channels offered by current programming and the number of ways to add HD sources to your TV will also expand.

Making the right connections

The first step to getting the best possible picture is to make sure you're using the best available connection between each video source and your TV. Check out the rear-panel picture on below, along with the descriptions of each type of input, for a quick look at your video connection options.



HDMI — This digital connection can carry high-definition video up to 1080p, as well as multichannel audio. It should be your first choice when connecting a high-def video component to your TV, like a Blu-ray player, HD cable box, or some gaming systems, such as the Xbox 360 or PlayStation® 3. Though component video is an excellent alternative, HDMI allows the video signal to remain in its pure digital form from wherever it started all the way until it's displayed on your screen. **Maximum resolution: 1080p**

Component video — The three-jack component video connection splits the video signal into three parts (one brightness and two color signals). Component video delivers an extremely accurate picture with clearer color reproduction and less bleeding than S-video or composite video. It's a good connection for DVD players and some cable and satellite TV receivers. Keep in mind that unlike HDMI, component video can't carry audio signals, so you'll need to make a separate audio connection. **Maximum resolution: 1080p** *Note: Although component cables can support a 1080p signal, many video source components and televisions are not able to send or accept a 1080p signal over a component connection.*

S-video — This 4-pin connector usually provides a sharp picture by transmitting the chrominance (color) and luminance (brightness) portions of a video signal separately. S-video connections generally outperform composite connections, but don't measure up to component video. Some components may only offer S-video connections, including older DVD players, VCRs, and some cable and satellite TV receivers. **Maximum resolution: 480i**

Composite video — This is the most universal video connector, found on most TVs made in the last 20 years. Picture quality is a big step up from RF, but typically not as good as S-video. Like S-video, some components may only offer composite connections, including older DVD players, VCRs, and some gaming systems (usually via a proprietary adapter cable). **Maximum resolution: 480i**

RF — RF is the lowest quality video connection. RF-type connections should generally be limited to bringing signals into your A/V system from outside your house, like when you're hooking up a TV antenna, cable TV jack, or satellite dish. Once the signal has reached your set-top box, use the highest-quality connection from the types listed above, preferably HDMI or component video. **Maximum resolution: about 350i**

In addition to choosing the best connection type, using a high-quality video cable can also improve picture quality, especially for analog connections. Video signals are actually more susceptible to degradation than audio signals, due to their much higher frequencies. That means radio frequency and electromagnetic interference can taint the signal, causing lines, snow, and other artifacts to appear on your TV screen. If you experience picture problems like these, look for a higher-quality cable with a copper conductor, 75-ohm impedance, good shielding, and corrosion-resistant snug-fitting connectors.

Adjusting your TV's picture controls

Most TVs come from the factory pre-set for display on a showroom floor, which won't necessarily make them look their best in your living room — you'll want to adjust yours to perform better in its new home. Plus, there's a wide range in quality when it comes to today's video signals, from standard broadcast and cable TV signals on the low end, to high-definition signals at the opposite end. High-quality sources typically need little or no "enhancement" to look their best, while lower-quality signals may require a combination of noise reduction, increased sharpness, and color correction. Check out the options we've discussed below to find the one that best fits your needs.

Level 1: Set it and forget it

If you're the set-and-forget type, there's one easy step you can take that will get you most of the way there for most sources. Virtually all current HDTVs include several factory-preset picture settings. These typically carry names like "Dynamic" or "Vivid," "Movie" or "Pro," or the always-popular "Standard." Each preset has its own settings for the most common picture parameters: brightness, contrast, color, sharpness, etc. Usually, even when you select one of these presets, you can still make further adjustments to tweak the picture to your liking. See the chart on page 5 to get an idea of which preset to use with different video sources.

Some HDTVs let you create and store customized picture control settings for each video input, letting you optimize each video source individually. If your HDTV can do that, your first step should be to grab your TV remote and, one by one, select each video input that's connected to a source. For each, go into the picture adjustment menu and choose the picture preset that looks best.

If your HDTV can't store different settings for each input, or if you plan to run a single set of A/V cables from your receiver to your TV, choose the video setting that applies to what you watch most of the time. You'll give up a bit of picture-customizing capability, but running a single set of audio/video cables from the receiver to your TV can simplify hookup and daily operation. Since changing these settings generally only takes a few seconds, you can always switch from "Standard" to "Pro" for movie night, or to "Vivid" for video games. It comes down to personal preference.

Picture preset	What it does	What it's good for
"Dynamic"/"Vivid"	Significantly increases contrast, brightness, and sharpness	Video games, animation, overcoming strong room lighting
"Standard"	Modestly increases contrast, brightness, and sharpness	Viewing standard broadcast, cable, or satellite programs
"Movie"/"Pro"	Contrast and brightness settings lowered for greater realism; enhancements like sharpness are reduced or eliminated	Viewing your best-quality sources like DVDs and HDTV programs

Level 2: Minor tweaking

If you don't mind digging a little deeper into the picture-setting menus, you can achieve a more custom-tailored picture. Here are some tips on how to get the most natural-looking picture.

Sharpness — Sharpness could more accurately be called "artificial edge enhancement." It can be used to improve the look of lower-quality signals like standard broadcast, cable, and satellite programs. However, having Sharpness set too high often creates halos around the edges of objects onscreen. You should generally turn Sharpness nearly to zero when watching high-quality video sources, like DVD movies or HDTV programs.

Brightness — This control is more officially known as "black level." The Brightness control changes the color and brightness of black within the picture. Brightness is usually set much too high. You should turn down the brightness control so that black looks black, but not so much that you can't make out the details in dark scenes.

Contrast — Often labeled "Picture," it is more accurately known as "white level." This setting controls the set's overall light level. The factory default setting is typically way too high; try backing it off to around 50% of the maximum setting. You want to make sure the edges of bright white objects onscreen are crisp and not blurred. (Having the Contrast set too high on a plasma TV can also increase the chance of temporary "screen burn-in," where an afterimage of what you were watching is be visible on the screen when you start watching something else.)

Color — Usually labeled "Color" or "Saturation," the color level is probably the most subjective picture adjustment. Still, you want to avoid a picture where it looks like everyone is sunburned, or colors are amplified to cartoonish extremes. Other settings that influence overall color include "Tint" or "Hue," and "Color Temperature." Fortunately, factory settings for color are usually close to where they should be.

Level 3: Calibration

If you want a simple and low-cost way to get a really accurate picture, consider purchasing a calibration DVD like the *Monster HDTV Calibration Wizard* — visit **crutchfield.com/testDVD** for more information. These discs make it really easy to calibrate your TV yourself to achieve the best possible picture. They offer tutorials and specially created test scenes to help you set your TV's color, contrast, black level, etc. to look their best in your viewing environment. For a sense of what you can achieve with a calibration disc, check out **crutchfield.com/WizardReview**

If you want to be 100% sure you're getting the best possible picture your TV can deliver, then consider having your set calibrated by a certified professional. These experts come armed with specialized test equipment, plus the knowledge and experience to confidently dig deep into your TV's "service menu" — an area best left to pros. This service typically runs $100-$400 or more depending on your TV. To locate a calibrator near you, visit the Imaging Science Foundation website at **imagingscience.com**

Making the signal fit the screen

There are two common TV screen shapes that most folks will recognize — the squarish shape of conventional TVs, and the widescreen shape of today's HDTVs. The term used to describe TV screen shape is "aspect ratio" — conventional TVs, and some small LCD HDTVs, have a 4:3 aspect ratio; most new HDTVs have a 16:9 ratio.

TV shows also typically have a 4:3 or 16:9 ratio. While most new HD programming is in 16:9, a significant amount of TV broadcasts are still sent in the conventional 4:3 ratio. Try to get familiar with the different aspect ratio modes your TV offers. Usually, there's a dedicated button on the remote, often labeled "Wide," that lets you cycle through several options. See the illustrations on the next page to get an idea of what 4:3 and 16:9 pictures will look like on your TV, and which aspect ratio setting best fits your tastes.

What pictures looked like on a conventional 4:3 screen

4:3 image on a 4:3 screen
Older TVs typically had a squarish 4:3 ratio. Some smaller HD-capable LCD TVs also have a 4:3 ratio.

16:9 image on a 4:3 screen
When widescreen 16:9 programs are displayed on a 4:3 screen, black bars appear on the top and bottom on the screen, because there's no picture information in those areas. Pictures with these horizontal black bars are often called "letterboxed."

What pictures look like on a 16:9 screen

16:9 image on a 16:9 screen
Most new HD broadcasts are in a 16:9 ratio, though there are still some in 4:3. Eventually, all TV shows will be filmed in 16:9. Nearly all new HD-capable TVs have a 16:9 screen.

4:3 image on a 16:9 screen
When 4:3 programs are displayed on a 16:9 screen, black bars appear on the sides of the screen, since there's no picture information in those areas. These are called "window-boxes" or "pillar-boxes."

4:3 image stretched on a 16:9 screen
If you'd like to get rid of the pillar-boxes, one option is to stretch the picture to fill the screen. Some sets stretch the image evenly across the screen, as above, while others only stretch the edges of the picture, leaving the center undistorted.

4:3 image zoomed on a 16:9 screen
Another option is to zoom in on the picture and fill the screen. This cuts off the top and the bottom of the picture, but leaves it undistorted.

You may choose to keep the black bars on 4:3 sources, or decide to stretch or zoom the picture — it's a matter of personal preference. A crisp digital show may still look reasonably clear and detailed when zoomed or stretched; but lower-quality signals, such as reruns of older shows, can look noticeably more blurry and washed out. Some folks aren't bothered by black bars on the side of the screen, while others prefer to alter the picture to fill the screen, even if that means a fuzzier image. You might also make your decision based on what kind of TV you have. For example, plasma TVs may experience screen burn-in if black bars are displayed for a long time. Make sure to check the owner's manual for suggestions. And check out our article on understanding aspect ratio at **crutchfield.com/aspectratio** for more information on other aspect ratio problems and fixes.

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